World Merchant Fleets

by Henri Le Masson

Paralleling the industrial development of the second half of the 19th century, the world merchant marine increased from 13,560,000 tons in 1860 to 28,950,000 tons in 1900 and 49,000,000 tons in 1914. By the end of the last war it had reached 58,000,000 tons (vessels over 1,000 tons). This increase is actually greater than the figures indicate, because the merchant fleet's performance has increased enormously during the last 30 years. Freighters, in particular, have increased their speed in a great many cases from the 8 to 10 knots which was the average prior to 1914 to 14 to 15 knots, in some cases even more since 1930. These freighters, traveling faster than their predecessors, thus are able to make a greater many trips per year, so that for the same amount of tonnage the carrying capacity of the merchant fleet as a whole has increased considerably. Before the last war this increase was estimated at 25 percent.

In 1939 many countries occupied a position in the hierarchy of merchant marines which did not correspond either to their population or to their industrial potential, for example, Norway, the Netherlands, and Greece. On the other hand, the second place position held by the United States should not lead to any illusions, for a considerable amount of tonnage was out of service and the important Atlantic - Pacific coastal shipping through the Panama Canal, which was reserved for the American fleet, also tied down a good many large ships. In fact, on the high seas, the Stars and Stripes held a more modest position than the Norwegian flag. The same was true to a certain extent of the French fleet, which dropped from fifth place among world fleets in 1914 to eighth in 1939; a large part of our tonnage was operating on "imperial" lines, benefiting from the national monopoly.

Under the dictatorial governments which at that time were guiding the destinies of their countries, the merchant fleets of Italy, Germany, and Japan never ceased to develop and to improve their position. "Tramps"

were not found in relatively significant numbers except in the British, Scandinavian, and Greek fleets.

Specialization

The fleet in service in 1939 was almost entirely "tailored to fit". Competition is severe on the high seas and the harsh law of supply and demand is the only force governing fluctuations in freight, because of the international character of maritime shipping. Thus the shipowner is never the "Master" of his market. More than any other industrialist he required that his "plant", that is, his fleet, be perfectly adapted to the requirements of his operations. The interest in specialization in the merchant marine is evident in the case of the passenger steamer, which is always built to be used on a specified line. The same is true for almost all freighters. For a long time ships have been built for the exclusive transport of fuel (coalers), fruit (banana boats and other fruit boats), wine (wine boats), wood, grain, minerals, phosphates, meat (refrigerator boats), combustible liquids (tankers). Specialization does not depend solely on the type of cargo. The nature of the hull -- tonnage and dimensions -- and the type of engine, the type of fuel, the facilities for handling goods, frequently vary as the result of the routes followed, the supply facilities, the equipment in the ports visited and the access to the ports (dimensions of locks and depth of basins).

Technical Progress between 1919 and 1939

Marine power evolved considerably during the years preceding the second World War. Before 1914 only a small number of fast passenger steamers (over 20 knots) were equipped with turbines. Only .45 percent of world tonnage were outfitted with Diesel engines, which had first appeared on the high seas a few years earlier. The cylindrical boiler, strong and reliable, but heavy and not very economical, and the alternating engine reigned almost unchallenged. Less than two percent of merchant vessels were burning mazut in 1914. This situation did not change appreciably during the first World War.

In 1939 the shipowners had a choice among very varied types of steam and Diesel installations. The steam types might include cylindrical boilers, boilers with forced circulation, watertube boilers, or even -- the most recent development -- forced circulation under high pressure, with alternating engines or turbines. There were two-cycle or four-cycle internal combustion engines (Diesels), with single or double action, high-speed or low-speed. Furthermore, in the case of turbines and high-speed Diesels which could not be coupled directly to the screw, there was a choice among reduction gears, hydraulic couplings, or electrical transmission. Coal had taken second place as a fuel. Fifty-eight percent of the world fleet was burning liquid fuel and "gas oil", while only 42 percent was still burning coal.

The Diesel engine was the type which developed the most during this period. In 1922 there was still not more than 2.35 percent of the world fleet which was equipped with this type of engine. In 1939 the figure was 24.5 percent. However, steam had also made great progress, particularly as the result of the turbine, also, from 1930 on, as the result of watertube boilers and boilers with forced circulation and very high pressure. In 1939 it was no longer unusual to equip a passenger steamer or a "mixed" vessel, or occasionally even a large freighter, with watertube boilers and superheater, calibrated between 27 and 30 kilograms per square centimeter. The weight of installations for steam engines had decreased 50 percent in ten years, and the consumption of fuel per horsepower hour had dropped from 400 grams to 275 - 290 grams of "liquid fuel". In many cases, therefore, the steam vessel was able, from the point of view of fuel consumption, to continue competition with the Diesel, which burned less than 200 grams per horsepower hour and which used a cheaper fuel.

England, Norway, the Netherlands, Japan, the United States, Germany, and Italy were, in descending order, the countries possessing the greatest number of "motorships". However, in proportion to the total tonnage of their fleets, Norway, Denmark, and Sweden, countries which had to import

all their fuel, were those where the Diesel engine had developed the most rapidly.

Replacement of Tonnage during the War

Whereas between 1914 and 1918 the merchant tonnage destroyed reached 13,000,000 tons, or 25 percent of the world fleet, the losses resulting from the last war are estimated at 38,000,000 tons, or a good half of the 1939 tonnage. However, there are 70,000,000 tons in service in 1949, or 10,000,000 tons more than in 1939. The effort expended to compensate for the losses has therefore been extraordinary.

In time of war circumstances do not permit the construction of ships under the same conditions as in time of peace. It is necessary to produce the maximum amount of replacement tonnage in the shortest possible period of time, which involves a radical transformation in the methods of construction. In order to achieve this, in the Anglo-Saxon countries at least, special shipyards were built. In these shipyards the largest possible number of standardized ships were assembled in series; the best-known types are the American "Liberty" and "Victory" ships, the English "Empire" and "Ocean" models, the Canadian "Fort", and the American "T - 2" tanker. Eighteen specially equipped American shipyards thus delivered a total of 2,580 "Liberty" ships, with an average construction period of two to three months. 531 "Victory" ships were assembled by five shipyards, and the 523 T - 2 tankers were built by only four firms, one of which alone delivered 203.

The "Liberty" ships represent about 28 percent of world tonnage (almost 19,000,000 tons), or about the equivalent of the total tonnage of the British merchant marine in 1939. Since the Liberation the concept of these ships and their characteristics have often been criticised unfavorably. In particular criticism has fallen on their speed (10 knots under full load), their high gross tonnage, and their construction, which is almost entirely welded. However, these ships very closely resemble a type

of British heavy freighter which was selected as one of the best in that category and which gave complete satisfaction in peace time, inasmuch as "tramp" vessels carrying heavy cargoes do not have to make great speed. The "Liberty" ships are slow because it was necessary to select for them a very classic type of 2,500-horsepower alternating engine which could be produced rapidly and in great quantity. Various accidents to the hulls have been attributed to the welding, but actually one could not hope that among 2,580 vessels, built for the most part by hastily assembled crews, there would not be some defects, since there was not time to test out each new technique completely. The use of welding technique in time of war was necessary because of its convenience and because of the facility with which the welding equipment could be produced.

Altogether the United States built 5,171 vessels between 1939 and 1945, with a total gross tonnage of 38,607,000 tons, or about the equivalent of all war losses chalked up during the same period. One should not be surprised, therefore, that since 1945 the American fleet ranks in first place. However, a large number of the vessels which compose it are poorly adapted to peacetime uses. There is a shortage of vessels "tailored to fit" certain needs, both passenger and cargo vessels. That is why the Americans have been willing to release a certain number of "Liberty" and T - 2 tankers ships to other powers, and have retired nearly 9,000,000 tons from service.

Motive Power in 1949

During the war the alternating engine enjoyed a return to favor. The "Liberty" ships alone represented 6,500,000 horsepower of alternating engines put into service between 1942 and 1945. But this is a situation of short duration. The Diesel engine is actually preferred by shipowners.

On 1 January 1945 there were 2,490,000 tons of "motor ships" under construction in the world, as compared with only 1,650,000 tons of steam vessels. The situation is even a little more favorable to the Diesel engine in the case of tankers, 918,000 tons as compared with 469,000 tons. Above

all, there has been a noticeable trend toward fast Diesel engines for average horsepowers, because they offer the advantage of smaller weight and occupy less space, inspite of the necessity of connecting them with the screws by means of intermediate reduction gears or by hydraulic or electrical transmission. It some cases it has been possible to achieve a weight of only 25 kilograms per horsepower, or even less.

During the war the turbine with gears also enjoyed considerably increased application. In 1946 there were already 5,500,000 more tons equipped with this type of engine than in 1939.

Many turbine installations in 1949 use steam under pressures of as much as 60 - 64 kilograms per square centimeter, and/at temperatures of 450 - 480°. The new French passenger steamers belonging to the General Trans-Atlantic Company, construction of which was started last year, will be equipped with boilers of this type. These are vessels of 20,000 horsepower and 40,000 horsepower for the Antilles line, (the "Flandre" and the "Antilles") and vessels of 10,000 tons and 14000 horsepower for the North Africa line (Ville-de-Marseille" and "Ville-de-Tunis").

In conclusion, it is necessary to emphasize the enormous progress made during the war by turbo-electric propulsion. It increased from 467,000 tons before the war to 5,767,000 tons in service in 1946, an exceptional increase of almost twelve fold. This increase is due exclusively to the choice of turbo-electric propulsion for the 523 T - 2 tankers.

We should add that in 1948 there was scarcely 25 percent of world tonnage which was still burning coal. These were primarily old vessels.

The World Fleet in 1949

Two-thirds of the world fleet consists of cargo vessels, which include 48,000,000 tons as compared with 34,000,000 tons in 1939. The remaining third is divided between passenger vessels and tankers. Passenger vessels represent only 9 percent of world tonnage, because this category suffered very heavy losses during the war and it was not possible to build vessels of the same sort to replace them. Tanker tonnage, on the other

hand, has showed a net gain, because in spite of losses it increased from 11,260,000 tons in 1939 to 14,560,000 tons at the end of 1948. Today the fleet used for the transport of oil represents nearly 20 percent of world tonnage, as compared with 3.5 percent in 1914.

Remarkable adjustments have been made since the war by many countries, among which England should be given primary mention. On 31 December 1948 1,367,000 tons (264 vessels) were under construction for her.

The rapid recovery of the Dutch, Norwegian, French, and Italian merchant marines should be also be pointed out, even though none of these countires has yet succeeded in regaining the 1939 level. With 414,000 tons (112 vessels) under construction, our country ranked second in the world for new construction on 31 December of last year. It exceeded even the United States, which had only 322,000 tons under construction at the beginning of 1949.

One particular case deserves to be emphasized, that of the small republic of Panama, whose merchant marine has increased by two million tons since 1939. Shipowners in certain countries do not hesitate to place part or all of their fleets under the Panamanian flag in order to benefit from the advantages which the fiscal and economic legislation in this country assure them. The relatively important position held by Panama on the high seas is therefore due to legislative manipulations. However, various boycott measures planned against her at the beginning of 1949 by the International Federation of Transportation Workers could, if put into effect, cause the situation to be reversed.

Large Ships

So long as the half-dozen giant passenger liners on the North Atlantic last, they will remain incontestably the largest ships in the world. One may, however, express some doubt as to whether in the future passenger vessels will be the largest vessels in the world fleet as they have been up to the present time. If aviation should play a larger part tomorrow in the transportation of travelers, passenger vessels will undoubtedly become

"mixed" vessels in the current sense of the word, rather than simply passenger vessels; they will very often be large cargo vessels on fast lines, in the central cabin of which a certain number of passengers will find comfortable, perhaps even luxurious, accommodations, but those displacement will very probably be less than that of large tankers. At the end of 1948 there were no less than 50 tankers of 26,000 to 32,000 tons under construction throughout the world, and several are being planned whose deadweight will reach 47,000 tons. Such vessels will consequently have a load displacement greater than that of passenger steamers like the "Caronia", the largest passenger vessel built since the war, which has just been placed in service. It is not impossible, therefore, that in the comparatively near future tankers will have to be classed at the head of the list of all ships throughout the world so far as displacement is concerned, and perhaps even from the point of view of dimensions.

World Merchant Fleets (Vessels of more than 1,000 tons)

1 September 1939			30 June 1948		
Country	Number	Gross Tons	Country	Number	Gross Tons
British Empire	3,319	17,771,000	United States	3,644	26,689,000
United States	1,379	8,125,000	British Empire	3,103	18,373,000
Japan	1,180	5,103,000	Norway	766	3,856,000
Norway	1,072	4,499,000	Panama	436	2,721,000
Germany	854	3,916,000	Netherlands	448	2,513,000
Italy	667	3,178,000	France	426	2,356,000
Netherlands	537	2,678,000	Italy	317	1,995,000
France	555	2,670,000	Sweden	512	1,719,000
Greece	436	1,697,000	USSR	418	1,299,000
Sweden	484	1,312,000	Greece	218	1,244,000
USSR	354	1,136,000	Denmark	274	946,000
Other countries	1,961	6,185,000	Other countries	1,908	6,873,000
Total	12,798	58,270,000	Total	12,470	70,584,000